

Abstract

A pressure sensor using an optically powered resonant integrated microstructure (O-RIMS). The pressure sensor comprises a planar substrate having a photodiode, a polysilicon shell, a microbeam having a resonant frequency and fastened to the shell, and one or more optical fibers. A fluorescent material, such as erbium, is placed on the surface of the substrate in proximity to the microbeam. A Fabry-Perot cavity is formed comprising the substrate, the microbeam, and the shell. Changes in the vibratory frequency of the microbeam caused by pressure on the shell causes light delivered by a optical fiber to be modulated as the microbeam vibrates. The modulated light is conveyed to a sensor electronics arrangement via the optical fiber. The sensor electronics arrangement determines the pressure surrounding the O-RIMS from the modulated light.